



सत्यमेव जयते

GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS

**Schedule of Technical Requirements
for
Approval of Vendors for Supply of
Porcelain Insulators**

STR No. TI/STR/010, Rev. 1)

ISSUED BY

RESEARCH DESIGNS & STANDARDS ORGANISATION,
TRACTION INSTALLATION DIRECTORATE,
MANAK NAGAR, LUCKNOW-226 011.

1.0 SCOPE:

This Schedule of technical requirement (STR) is to assess the manufacturing capability of Vendor for Porcelain Insulators.

2.0 GENERAL INFRASTRUCTURE &MANUFACTURING FACILITIES:

- 2.1 The manufacturer should have adequate covered accommodation for
- 2.1.1 storing of raw material,
 - 2.1.2 items awaiting for inspection, finished items awaiting for dispatch and arranging for inspection.
 - 2.1.3 Separate space should be available for storing, inspection and issue of metal fittings.
- 2.2 The manufacturer should have system to ensure that the product conforms to relevant specifications as given under.

S.N.	Product	Specification
1.	25kV solid core porcelain insulators.	RDSO's specification No. ETI/OHE/15 (9/91) with a & c slip nos. 1 to 3 TI/SPC/OHE/INS/0070 (with latest amendment).
2.	66kV/110kV/132kV/245kV solid core post insulators	RDSO's specification No. ET/OHE/64 (10/88) with a & c slip no. 1 TI/SPC/OHE/POST/0100 with latest amendment.
3.	Pedestal post insulators	IS: 2544 - Latest
4.	Hollow insulators	IS: 5621 - Latest
3.	Disc insulators	IS: 731 - Latest & 1EC: 575 & 797 - Latest read with RDSO instructions

3.0 MACHINERY AND PLANT:

Following machinery and plant of suitable capacity should be essentially available.

SN.	Machinery and Plant
i	Ball mills.
ii	Blungers
iii	Roto pumps for slip transfer
iv	Electromagnetic filters/permanent magnet set.
v	Slip filters.
vi	Hydraulic piston pumps.
vii	Filter presses.
viii	De-airing pug mills
ix	Blank drying chamber
x	Boring and turning lathes.
xi	Batch dryers.
xii	Dry finishing rolling machine wherever required.
xiii	Dip glazing set up or spray glazing set up wherever required.
xiv	Shuttle kilns.
xv	Cutting & grinding machines.
xvi	Chamfering machine.
xvii	Cement mixing machine
xviii	Cement injecting machine
xix	Assembly jigs.
xx	Curing chamber / tanks.

xxi	Overhead cranes, forklifts, weighing machines etc.
xxii	Vernier calipers, internal & external calipers, measuring instruments and tools required for day to day work.

4.0 DRAWING OFFICE

The manufacturer should have a drawing office with basic facilities like ammonia printing machine photo copy machine, drafting machine, stencils etc. **availability of CAD facility, suitable printer/potter etc.** with the manufacturer will be preferred.

5.0 MAINTENANCE OF MACHINERY & PLANT.

The manufacturer should have a separate maintenance department with adequate staff strength to maintain all the machines of the plant and to fabricate **Adequate number of jigs and fixtures** required in the manufacturing process and testing **should be available with the manufacturer.**

6.0 CHEMICAL LABORATORY

6.1 The manufacturer should have adequately equipped chemical laboratory with adequate staff for conducting various tests on Raw Materials, tests to be conducted at various stages of manufacture and tests to be conducted on the final product.

6.2 At least a diploma holder shall be responsible for the internal tests conducted on, the insulator shells and assembled insulators. In case of laboratory, at least a graduate in Science / Geology / Ceramics shall be responsible for conducting various tests starting from Raw Material.

The following basic testing requirements of adequate capacity shall be available.

SN.	Instrument
i	Particle size analyser
ii	MOR testing machine
iii	Viscometer
iv	Drier, Air Oven and Muffle Furnace.
v	Electronic type, physical and chemical balances.
vi	pH meter.
vii	Extrusion machine for test specimens.
viii	Equipment / machines required to develop and test new body
ix	Glass equipment like burette, pipette, conical flask etc. for chemical analysis.
x	Sufficient stock of chemicals

7.0 TESTING FACILITIES

The following machines / equipment of adequate capacity shall be essentially available:

SN.	Machine/Equipment
i	Porosity testing machine
ii	Ultrasonic testing machine
iii	Internal Pressure testing machine for hollow insulators.
iv	High voltage transformer set up suitable for a) Electrical routine test on hollow insulators. b) Electrical routine test on disc insulators. c) Puncture test on disc Type B insulators.
v	High frequency transformer for routine testing of disc insulators.
vi	Universal testing machine for Tensile, bending and torsion test:

	a) Facility for tensile, Eccentric tensile (for Sectioning Insulator), Bending and Torsion (For post insulator) tests should be available. b) Facility for electro-mechanical failing load test should be available in case of disc insulators.
vii	Temperature cycle test arrangement.
viii	Thermal mechanical performance test arrangement.
ix	Vernier calipers, internal and external calipers and various tools required for day to day work.
x	Hardness testing machine
xi	Go & No-Go gauges for metal filling.
xii	Various jigs for different types of insulators for mechanical load testing (Tensile, bending & torsion).

8.0 QUALITY CONTROL REQUIREMENTS

- 8.1 The firm should have acquired ISO :~~9000~~**9001:2015** series certification for the product for which an approval is sought and the product should be broadly covered in the scope of the certification for manufacture and supply.
- 8.2 Quality manual of the firm for ISO :~~9000~~**9001:2015** should clearly indicate at any stage the control over manufacturing and testing of the said product.
- 8.3 A system of easy traceability of the product from raw material stage to finished product stage should be available.
- ~~8.4~~ **8.4** The Quality Assurance Plan (QAP) of the product ~~should be into the following parts~~**prepared as per RDSO ISO guidelines should be available.**
~~Part I – Raw material and process.~~
~~Part II – Metal fittings and hooks.~~
~~Part III – Tests.~~
- ~~8.5~~ ~~A Quality Manual of the firm indicating the extent of control over production, quality control and testing should be available.~~
- 8.6 A policy of disposal of rejected material and maintenance of record for documentary evidence should be available.
- 8.7 A system of documentation in respect of rejection at customer end, transit replacement, failure replacement and remedial measures taken should be available.
- 8.8 System should exist for documentation of the following:
- 8.8.1 Incoming Raw Material with **Test Certificate** (TC) reference of supplier as well as internal test and audit checking from outside agency, if required.
- 8.8.2 Ensure that details regarding the test results of various stages in production and routine testing are available.
- 8.8.3 Ensure that a system exists for calibration of testing & measuring equipment and record is maintained.
